AMENDMENTS TO THE CLAIMS

The listing of claims below replaces all prior versions, and listings, of claims:

1. (Original) A method, comprising:

storing a first data structure containing costs associated with transmitting data between routers in a network;

combining the first data structure with itself to determine a cost of transmitting the data; and

transmitting the data along a route based on the calculated cost.

2. (Original) The method of claim 1, further comprising storing a second data structure defining router connections in the network.

3. (Original) The method of claim 2, wherein storing the second data structure comprises storing a matrix defining router connections.

4. (Original) The method of claim 3, wherein storing the first data structure comprises storing a matrix, wherein the costs are based on at least one of a distance, reliability, security, or expense of transmitting the data between routers in the network.

5. (Original) The method of claim 4, wherein combining the first data structure with itself calculates the cost of transmitting the data between a source router and destination router in the network for a given number of steps at minimal cost.

6. (Currently Amended) The method of claim 5, wherein the transmitting the data along the route further comprises determining the route between the source router and the destination router based on the cost matrix and the connection matrix.

7. (Original) The method of claim 2, further including determining the second data structure.

8. (Original) The method of claim 1, wherein transmitting the data comprises transmitting an IP data packet.

9. (Original) The method of claim 1, further including determining the first data structure.

10. (Currently Amended) An apparatus, comprising:

an interface adapted to receive a data packet;

at least one storage device to store:

a first data structure defining router connections in a network; and

a second data structure that defines a cost associated with links between routers in the network; and

a controller adapted to:

combine the second data structure with itself at least once to determine a cost for transmitting the data packet; and

determine a route based on the first data structure and the ~~calculated~~ determined cost for transmitting the data packet.

11. (Original) The apparatus of claim 10, wherein the first data structure comprises a first matrix that defines the router connections in the network wherein the router connections comprise adjacent router connections.

12. (Original) The apparatus of claim 11, wherein the second data structure comprises a second matrix that defines the cost associated with each link between adjacent routers as exponents.

13. (Original) The apparatus of claim 12, wherein the cost of each link between a router and itself is defined as zero and the cost for each link from a router to a non-adjacent router is defined as infinity.

14. (Original) The apparatus of claim 13, wherein the controller is adapted to combine the second matrix using the formula $\min_{1 \text{ to } k} (D_{ik} * D_{kj})$, wherein k is the number of the routers and the second matrix is represented by D that has i rows and j columns.

15. (Cancelled)

16. (Original) The apparatus of claim 12, wherein the costs are based on at least one of a distance, reliability, security, or expense of transmitting the data packet between the adjacent routers in the network.

17. (Currently Amended) The apparatus of claim 12, wherein the controller is further adapted to combine the second matrix with itself a ~~number~~ plurality of times until the cost of transmitting the data packet between a source router and destination router is minimum for a given number of steps.

18. (Original) The apparatus of claim 10, wherein the controller is adapted to determine a direct connection between each link of the route based on the first data structure.

19. (Original) The apparatus of claim 10, wherein the controller is further adapted to transmit the data packet along the route.

20. (Original) The apparatus of claim 10, wherein the data packet is an IP data packet.

21. (Currently Amended) An article comprising at least one machine-readable storage ~~media~~ medium containing instructions for routing a data packet, the instructions when executed causing a controller to:

represent node connections in a network in a first matrix;

represent costs of transmitting the data packet ~~between each of~~ among a plurality of nodes in a second matrix, the second matrix containing elements expressed as exponents each representing distances between corresponding pairs of nodes; and

determine a route to transmit the data packet based on the first matrix and the second matrix.

22. (Currently Amended) The article of claim 21, wherein the instructions when executed cause the ~~processor~~ controller to transmit the data packet over the route.

23. (Currently Amended) The article of claim 21, wherein the instructions when executed cause the ~~processor~~ controller to represent adjacent node connections in the first matrix.

24. (Cancelled)

25. (Currently Amended) The article of claim ~~24~~ 21, wherein the instructions when executed cause the ~~processor~~ controller to represent a cost between each node and itself as zero and each node to a non-adjacent node as infinity.

26. (Currently Amended) ~~The article of claim 25, wherein the instructions when executed cause the processor to~~ An article comprising at least one machine-readable storage medium containing instructions for routing a data packet, the instructions when executed causing a controller to:

represent node connections in a network in a first matrix;

represent costs of transmitting the data packet among a plurality of nodes in a second matrix;

determine a route to transmit the data packet based on the first matrix and the second matrix; and

combine the second matrix using the formula $\min_{1 \text{ to } k} (D_{ik} * D_{kj})$, wherein k is the number of the routers and the second matrix is represented by D that has i rows and j columns.

27. (Cancelled)

28. (Currently Amended) The article of claim 21, wherein the instructions when executed cause the ~~processor~~ controller to represent the costs ~~comprises the processor to represent~~ including at least one of a distance, reliability, security, or expense of transmitting the data packet between each of the plurality of nodes.

29. (Currently Amended) The article of claim 21, wherein the instructions when executed cause the ~~processor~~ controller to combine the second matrix with itself a ~~number~~ plurality of times until the costs of transmitting the data packet between a source node and destination node are minimum for a given number of steps.

30. (Currently Amended) The article of claim 21, wherein the instructions when executed cause the ~~processor~~ controller to determine the route to transmit an IP data packet.

31. (Currently Amended) A data signal embodied in a carrier wave comprising instructions for routing a data packet to at least one of a plurality of network entities, the instructions when executed causing a controller to:

store a connection matrix indicating adjacent nodes in a network;

store a cost matrix expressing transmission costs as exponents; and

determine a route for transmitting the data packet based on the connection and cost matrices from a first node to a second node.

32. (Currently Amended) The data signal of claim 31, wherein the instructions when executed cause the ~~processor~~ controller to transmit the packet data over the route.

33. (Currently Amended) A communication system, comprising:

a source entity adapted to transmit a data packet;

a router capable of receiving the data packet, the router adapted to:

define a cost matrix containing transmission costs associated with routing the data packet between ~~a pair~~ pairs of routers in a network;

determine a transmission cost of transmitting the data packet ~~data~~ to a destination entity ~~based on~~ using the cost matrix to iteratively determine a minimum distance between any pair of routers in one hop up to N hops, where N is two or greater; and

transmit the data packet to the destination entity using a route associated with the transmission cost.

34. (Original) The communications system of claim 33, wherein the data packet is an IP data packet.

35. (New) The communication system of claim 33, wherein the router is adapted to iteratively determine the minimum distance between any pair of routers in one hop up to N hops by:

combining the cost matrix with itself to produce a resultant matrix that represents the minimum distance between any pair of routers in one hop; and

combining the resultant matrix with the cost matrix to produce a second resultant matrix that represents the minimum distance between any pair of routers in two or fewer hops.

36. (New) The method of claim 1, wherein combining the first data structure with itself produces a resultant data structure that contains elements each representing a distance between a corresponding pair of routers in one hop, the method further comprising:

combining the resultant data structure with the first data structure to produce a second resultant data structure that contains elements each representing a distance between a corresponding pair of routers in two or fewer hops.

37. (New) The method of claim 36, further comprising:

combining the second resultant data structure with the first data structure to produce a third resultant data structure that contains elements each representing a distance between a corresponding pair of routers in three or fewer hops.

38. (New) The apparatus of claim 10, wherein the controller is adapted to produce, based on combining the second data structure with itself, a resultant data structure D^1 containing elements each representing a distance between a corresponding pair of routers in one hop, the controller adapted to further produce resultant data structures D^m, where m is two and greater, based on combining the resultant data structure D^{m-1} with the second data structure, where D^m contains elements that represent distances between corresponding pairs of routers in m or fewer hops.

39. (New) The apparatus of claim 38, wherein the controller is adapted to iteratively increment m until the controller has identified a resultant data structure D^m that contains elements that represent minimum distances between corresponding pairs of routers.

40. (New) The article of claim 21, wherein the instructions when executed cause the controller to:

combine the second matrix with itself to produce a first resultant matrix D^1 that contains elements representing distances between corresponding pairs of routers in one hop; and

produce additional resultant matrices D^m, m being two and greater, by combining the resultant matrix D^{m-1} with the second matrix, each resultant matrix D^m containing elements representing distances between corresponding pairs of routers in m or fewer hops.